Claims

Claim 1. (Original) A linearity compensation circuit for a non-linear system that introduces harmonic distortion into an input signal comprising:

means for generating from the input signal a plurality of separate corrected harmonic components using Hilbert Transformer filters; and

means for summing the plurality of separate corrected harmonic components with a delayed version of the input signal to provide a corrected input signal with harmonic cancellation of the harmonic distortion.

Claim 2. (Original) The linearity compensation circuit as recited in claim 1 wherein the generating means comprises a plurality of harmonic correction units for harmonics of a fundamental frequency of the input signal, each harmonic correction unit having the input signal as an input and the respective separate corrected harmonic component as an output.

Claim 3. (Original) The linearity compensation circuit as recited in claim 2 wherein the summing means comprises:

an input compensating delay circuit having the input signal as an input and a delayed input signal as an output, the input compensating delay circuit delaying the input signal to compensate for the processing time of the harmonic correction units; and

a summer having the separate corrected harmonic components and the delayed input signal as inputs and having the corrected input signal as an output.

Claim 4. (Currently Amended) The linearity compensation circuit as recited in claim 2 wherein each harmonic correction unit comprises:

an input filter having the input signal as an input and providing an amplitude/phase corrected input signal as an output;

a Hilbert Transformer filter having the amplitude/phase corrected input signal as an input ~~an~~ and providing a first signal as an output;

means for delaying the amplitude/phase corrected input signal to produce a second signal as an output, the delay for the delaying means being equal to the processing time of the Hilbert Transformer filter;

means for phase shifting the first and second signals to produce a desired harmonic for the harmonic correction unit, the phase shifting means providing a plurality of separate phase shifted signals; and

means for multiplying the plurality of separate phase shifted signals together to produce the respective separate corrected harmonic component.

Claim 5. (Original) The linearity compensation circuit as recited in claim 4 wherein the phase shifting means comprises a plurality of phase shifting units each having as inputs the first and second signals and providing as outputs the separate phase shifted signals.

Claim 6. (Original) The linearity compensation circuit as recited in claim 5 wherein each phase shifting unit comprises:

a first scaler having the first signal as an input and providing a scaled first signal as an output;

a second scaler having the second signal as an input and providing a scaled second signal as an output; and

means for summing the scaled first and second signals to produce the respective separate phase shifted signal.

Claim 7. (Original) The linearity compensation circuit as recited in claim 6 wherein scale factors for the first and second scalers are a cosine and a sine function respectively, the cosine and sine functions having the same argument which is a function of the desired harmonic for the particular harmonic correction unit.